Using models for how energetic electrons heat the atmosphere during flares, we simulate the radiative-hydrodynamic response of the lower solar atmosphere to flare heating. The simulations account for much of the non-LTE, optically thick radiative transfer that occurs in the chromosphere. Our models predict an increase in white light continuum during the flare on the order of 20%, but this is highly sensitive to the electron beam flux used in the simulation. We find that a majority of the white light continuum originates in the chromosphere as a result of Balmer and Paschen recombinations, but a significant portion also forms in the photosphere which has been heated by radiative backwarming.